Nature of the Modern Coastal System

Sediment Supply for Coastal Barriers

Barrier islands are not created equal. Many barrier island segments are sediment poor while some have adequate supplies to maintain a healthy island system. The North Carolina coast is characterized by two basic types of barrier islands (Fig. 4). Complex barrier segments are sediment-rich and consequently are generally wide and high islands. They consist of multiple beach ridges and swales and extensive dune fields. Simple barrier segments are sediment-poor, low and narrow, are dominated by inlet and overwash dynamics, and tend to be relatively young.

In addition to the sand that is already on any given barrier island, there are four major potential sources of sand that play variable roles in the sediment budget of the North Carolina barrier island system.

1. Inlets (Fig. 5) between barrier segments contain several types of sand deposits within the various channel systems, the flood-tide delta on the estuarine side, and the ebb-tide delta on the oceanic side.
2. Deposits of sand and gravelly sand occur in paleo-riverine channels and paleo-deltaic sediments deposited by the larger trunk rivers on the continental shelf during previous glacial intervals characterized by sea-level lowstands (Mallinson et al., 2005).
3. Tremendous volumes of sand are potentially available in cape-shoal structures (Fig. 1): Diamond Shoals off Cape Hatteras (Boss and Hoffman, 2000), Lookout Shoals off Cape Lookout, and Frying Pan Shoals off Cape Fear (Riggs and Cleary, 1997).

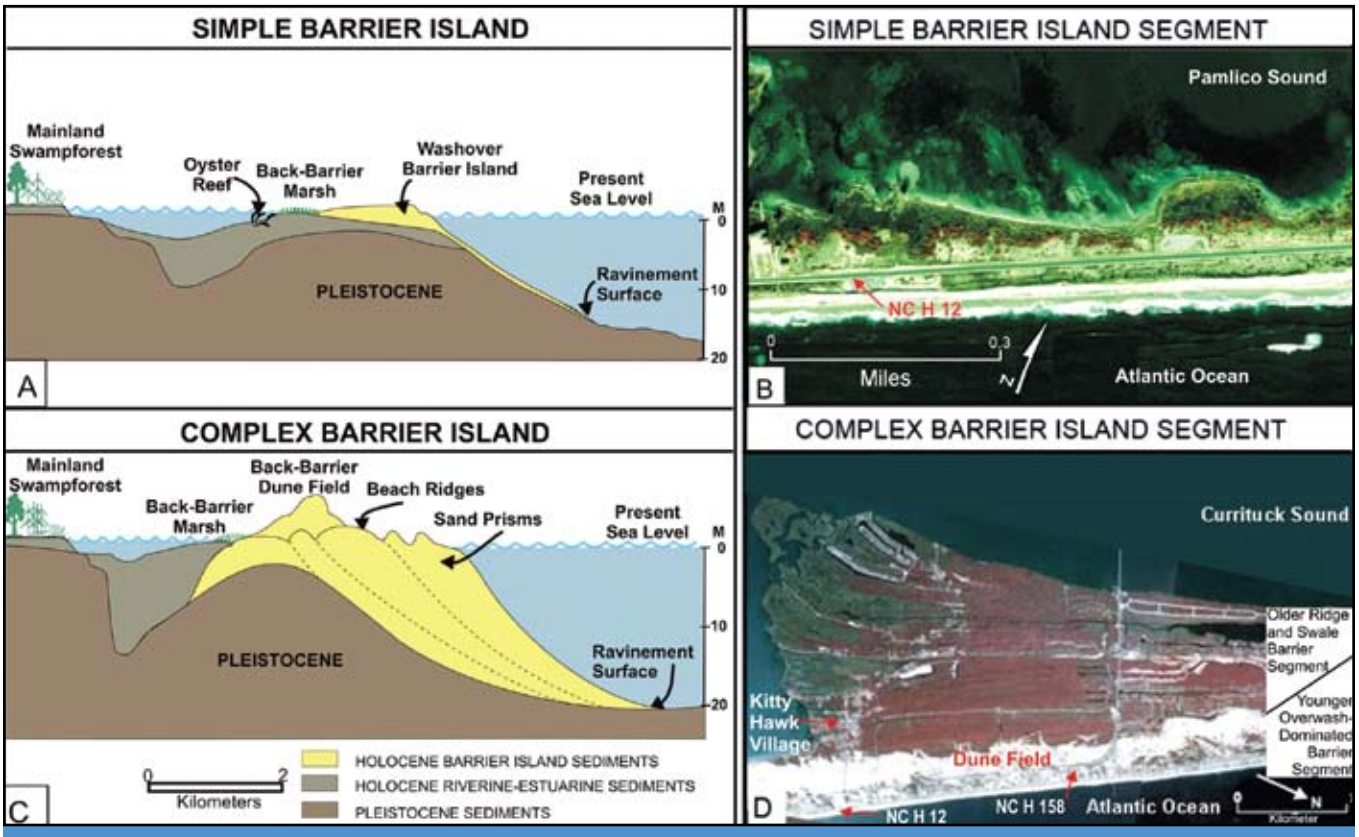

FIGURE 4. *Panel A Shows a schematic cross-sectional diagram of a simple inlet/overwash-dominated barrier island. Panel B is a 1998 aerial photograph of a simple barrier island segment just north of Buxton. Panel C shows a schematic cross-sectional diagram of a complex barrier island. Panel D shows a 1982 aerial photograph of Kitty Hawk Woods, a complex barrier island segment.*